

Appl. No. 10/694,263
Reply to Office Action of June 7, 2006

REMARKS

New claims 20 - 23 has been added in order to alternately define the invention as disclosed in the specification. Applicants submit that the cited prior references fail to teach or suggest a polishing method including alternating a step of electropolishing and a step of chemical mechanical polishing, and further wherein the electropolishing in the electropolishing step is continued past a determined electropolishing end point while reducing a current applied in said electropolishing until a current density in an electropolished surface reaches a predetermined current density or less.

Applicants respectfully request reconsideration of the examiners rejection of claims 6 - 19 under 35 U.S.C. § 112. Applicants submit that in light of the currently amended claims, the examiners rejection must be withdrawn.

Applicants respectfully request reconsideration of the prior art rejections of claims 6, 12, and 16 set forth by the Examiner under 35 U.S.C. § 102. The Examiner has rejected these claims in view of the cited prior art reference of *Sharan et al.* (U.S. Patent App. No. 2003/0062269). In the last Office Action, the Examiner stated that that the Sharan the reference teaches a method of polishing a substrate by electrochemical mechanical polishing wherein the electric current is pulsed on and off. In such an instance, the method would have included alternating steps of CMP (when the current was pulsed off) and ECMP (when the current was pulsed on a). We specifically, the Examiner stated that the ECMP the process disclosed in the Sharan reference was considered to be within the scope of the claim term "electropolishing" because the ECMP operation included the electrolytic dissolution of the surface. The Examiner stated that the USPTO manual of classification for class 205 supported his position.

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Accordingly, in order to further distinguish their invention, Applicants have amended the claims to require that the electropolishing step involve no mechanical polishing element, and wherein the chemical mechanical polishing step include no electropolishing element. As noted on page 24 of Applicants disclosure, Applicant's invention provides for a high polish rate during chemical mechanical polishing, and therefore substantially reduces the amount of time that the chemical mechanical polishing apparatus is occupied by any one particular subject wafer. The Sharan reference fails to teach or suggest such a method. Rather, the method disclosed in Sharan requires that the chemical mechanical polishing apparatus be occupied during the both the entire electropolishing and the entire chemical mechanical polishing process.

Advantageously, in accordance with the claimed invention, by polishing the metal film by alternating an electropolishing step (involving no mechanical portion) with chemical mechanical polishing or chemical buffing, the metal film surfaced is roughened by the electropolishing so that a high mechanical polish rate is attained. Furthermore, because the electropolished surface is also polished by chemical mechanical polishing or chemical buffing, it is possible to obtain a high quality polished surface such as that which is attained through chemical mechanical polishing or chemical buffing alone. Applicants respectfully submit that the prior art references of record, provide no teaching or suggestion whatsoever regarding this advanced in the art.

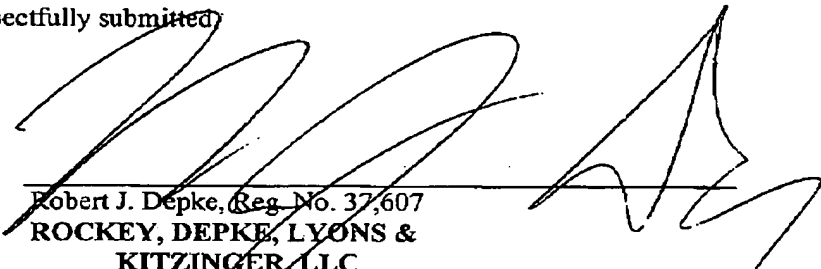
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Accordingly, in light of the foregoing, Applicants respectfully submit that all claims
now stand in condition for allowance.

Respectfully submitted,

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